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ABSTRACT

A longitudinal study explored cultural historical change within the Zinacantecan Mayan culture to create theoretical and empirical links between individual processes of cultural apprenticeship and societal processes of cultural change. The study examined the transmission of culture from parent to child in an apprenticeship relationship as the Zinacantecan culture moved from an agricultural base to a commercial base. Qualitative and quantitative findings point to a process of reciprocal change in which societal conditions provide an ecological push toward new modes of cultural apprenticeship and as new modes of apprenticeship create a younger generation with the skill profile appropriate to the changed societal conditions. The findings indicate that as cultures change over time, so do the processes of cultural learning and cultural transmission. (JPB)

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SRCD TALK --

ED 414 027

History, Culture, Learning, and Development

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In human history, there have been three major ecological adaptations: hunting and gathering, agriculture, and commerce/technology. We hypothesize that each ecology emphasizes a different set of skills, different developmental pathways, and different processes of socialization or informal education.

The research I shall talk about investigates the historical transition from agriculture to commerce, focusing on its implications for learning and development.

The sociohistorical approach to development has become increasingly important in our field. Yet the developmental implications of historical change have not been studied directly - by comparing the development and socialization of one generation with that of the next. To do this, longitudinal evidence across more than one generation is required. The evidence must be both behavioral and historical. It is precisely this sort of controlled longitudinal, historical, behavioral data that has, up to now, been lacking. And it is this kind of evidence that I will present here today.

In taking up these issues of the connection between history and individual development, it is important to consider how, methodologically, to connect **macro**conditions on the societal level to the **micro** level of individual development and behavior. We propose that structural equation modeling is a statistical technique well suited to this task, and I will present examples of this type of

analysis. These quantitative analyses are based on qualitative analyses, which I will also present, by means of video and slides.

SLIDE 3: Nabenchauk in 1969.

Our study site is Nabenchauk, a Zinacantecan Maya community in the highlands of Chiapas Mexico.

The first generation was studied by by collaborators Patricia Greenfield and Carla Childs in 1969 and 1970; they returned to study the next generation in 1991. The study continued in 1993, and I became part of the field team in 1995. Between 1970 and 1991, the community was in the process of a transition from agriculture and a subsistence economy to commerce, entrepreneurship, and cash.

This is Nabenchauk in 1969. agrarian - corn and beans are being grown.

Slide 4 (picture). Nabenchauk in 1991: This is Nabenchauk in 1991. Electrification has arrived. It brought one aspect of a cash economy - purchase of consumer goods, such as televisions and radios.

Slide 5 (picture). combi: This is a volkswagon van. It is a symbol of economic change and development. Men who formerly farmed now were in the transport business. They had become commercial entrepreneurs, running a van service back and forth to the neighboring Mexican city of San Cristobal de las Casas.

Slide 6 (picture). truck. Others into trucking, as both drivers and owners.

Slide 7 (picture). selling serviettas. Girls and women also got involved in commerce. For example, here, selling serviettas. A servietta is a woven item Zinacantecan females have created especially to sell to tourists and other outsiders.

Slide 7 (text)

These economic changes entailed changes in values, practices, and cognition: from tradition to innovation, from independence to interdependence, and from specificity to abstraction.

1. FROM TRADITION TO INNOVATION:

Entrepreneurship entails an ideology of innovation. Innovation was in sharp contrast to the values and practices observed in 1969 and 1970. At that time, tradition rather than innovation was valued; there was but a single baz'i or "true" way to do everything from speak to dress. In an agrarian society, the older generation controls land; this dominance of the elders is a force for traditionalism. As commerce started, the generations became more independent of each other, and the conservative force of the older generation was lessened. With their entry into textile commerce, albeit modest, women became somewhat more independent of men

2. FROM INTERDEPENDENCE TO INDEPENDENCE:

Transport makes individual family members more independent from one another. Earlier, families were more interdependent than independent on a behavioral level, for example, eating almost all meals together. As another example of the interdependence inherent in a subsistence economy, women and teenage girls made the clothing worn by the whole family.

3. FROM SPECIFICITY TO ABSTRACTION

Subsistence involves exchanges and contributions of very specific items. A cash economy involves the abstraction of money, which is a totally generalized medium of exchange.

Slide 5 (picture) Katal at the loom, 1970.

Our focus for studying these changes was on the cognitive skills and learning processes involved in the important cultural technology of weaving, the most complex skill in the culture, a skill acquired by all Zinacantecan females.

Slide 6 (text)

FROM TRADITION TO INNOVATION: THE CREATION OF ARTIFACTS

In 1969 and 1970, woven artifacts, like other parts of the culture, were stable and unchanging, limited by tradition. Woven patterns were limited to two red-and-white striped configurations, one multi color stripe, and one gray and white checked pattern. Here is one example::

Slide 7 (picture). Telex and Antun, 1970: In 1970, all males dressed alike, e.g., these two boys are wearing the Zinacantecan poncho pattern. By

1991, each poncho had unique, innovative elements of design. Here are three examples, each with different brocaded and embroidered designs.

Slide 8 (picture), men's poncho
Slide 9 (picture), men's poncho

Slide 10 (picture), men's poncho

Unlike the 1970 weavers, weavers of the 1990s were engaging in a constant process of pattern innovation. No two pieces of clothing or other woven items were exactly alike. We saw both new motifs and new recombinations of old motifs.

Slide 11 (text)

FROM INTERDEPENDENCE TO INDEPENDENCE: APPRENTICESHIP

Based on our research in 1969 and 1970, we concluded that the goal of Zinacanteco education and socialization was the intergenerational replication of tradition: learning to weave meant learning to weave about four specific patterns. According to the findings of our research, the particular way in which weaving was taught fostered this goal: The learning process was a relatively error-free one, in which the teacher, usually the mother, sensitively provided help, models for observation, and verbal direction in accord with the developmental level of the learner. Mother provided a scaffold of help that allowed learner to complete a weaving she could not have done by herself. There were no failures. Because the process was highly structured by the older generation and did not allow room for learner experimentation and discovery, the method of informal education (or apprenticeship) was well adapted for the continuation of tradition, the status quo.

In a videotaped weaving session in 1970 Katal, a 9-year-old girl, is seen arning to weave. At first she is there by herself. Eventually her mother enters to help her on her own initiative, without being summoned by her daughter. This is in sharp contrast to what we see in a later videotape, when Katal's daughter, also age 9, learns to weave in 1991.

In the clip of Katal and her mother at the loom, her mother is very much there with her, continuously helping her daughter or doing part of it for her daughter. There are four hands on the loom during much of the time the mother is there.

Whereas this method of apprenticeship is adapted to transmitting a tradition intact, the next method, with its emphasis on the learner's own discovery process, is adapted to the development of an ability to innovate. If innovation had in fact entered the culture as a value orientation in response or as part of commercial entrepreneurship, we thought that weaving education would make a corresponding shift. Earlier the teacher had carefully built a scaffold of help for the learner, providing help before the learner had an opportunity to make a serious error. Because the learner, in this situation, received very little opportunity to make a mistake, let alone to explore, we predicted that the methods of teaching and learning would have changed to a more <u>independent</u> trial-and-error approach. Independence could come from having a mother engaged in her own commercial activity also. This can be seen in a clip in our archives of Katal's daughter learning to weave in 1991.

<u>Slide 12: Katal as mother.</u> Katal grew up and had daughters of her own.

video. Katal's daughter Loxa can be seen learnig to weave on a videotape at the same age her mother had been in 1970. In this tape, the mother is not there at all serving as a weaving teacher. This is not because she is not at home. She is busy embroidering a blouse that Patricia Greenfield is going to buy. Second, the teacher no longer comes from the older generation; it is the learner's sister. Third, although her sister is the teacher, she is paying little attention and Loxa (the learner) has to call her twice, taking the initiative to get her attention. This tape shows most clearly that Learning has moved from interdependent to independent.

This historical case study was confirmed by the quantitative results. I am going to show you a structural equation model that indicates the pathway by which historical period, a very distal variable, changed processes of cultural apprenticeship, a set of proximal variables.

Slide 13: Weaving model. (Appended at end). The more proximal variables, age cohort of weaving teacher and learner initiation of help, are based on coding 72 videotapes of girls at different stages of learning to weave in 1970 and the 1990s. Learner and mother participation in textile commerce is based on interview and census information concerning various commercial activities involving textiles. Selling weavings to tourists, seen in an earlier slide, was one example. Historical period refers to whether a subject was a member of the earlier generation, studied as children in 1970, or the generation of their daughters, studied as children in the 1990s. This model shows that, from one historical period to the next, participation in textile-related commerce increased. An increase in textile related commerce, in turn, caused a shift in weaving instructors to the same

generation as the learner. This change in the characteristics of the person guiding the apprenticeship process, in turn, led to more initiation from the learner and less from the teacher when help was needed. The fit of this model to the data is at the maximum value of 1. Each of the individual links in the model is also significant at the .05 level.

Slide 14 (text):

FROM SPECIFICITY TO ABSTRACTION:
VISUAL REPRESENTATION

In 1969 and 1970, Greenfield and Childs also did a cognitive experiment. One of its goals was to assess the cognitive effects of weaving on pattern representation.

Slide 15 (picture). apparatus for pattern representation experiment. Task: to create representations of two traditional Zinacanteco woven patterns. There were several colors and three widths of stick available, thin, medium, broad.

Slide 16 (picture) the two patterns. The two variations of the male pattern are on top, the two variations of the female pattern are on the bottom. Male pattern (poncho) - simple stripe. Female pattern (shawl) - complex red stripe.

Slide 17 (picture) style of representation: This style of representation was typical for skilled weavers. Accurate analysis of configuration of stripes. Also, most important in the present context is the weavers' specific or detailed representation: each thread in a broad stripe is represented by a separate, thin stick.

Slide 18 (picture): abstract style of representation: top pair is a style of representation never used by Zinacantecan weavers, but used by U.S. college students to represent the Zinacantecan textile patterns. Like Zinacantecan weavers, accurate, analytic representation of configuration of

stripes. However, uses single broad stick for a broad stripe, rather than several thin ones. As a representation of woven garment, it is equally accurate, but less specific or detailed, more general or abstract.

Slide 19 (picture): Sticks 1991. We repeated the experiment in 1991 with the same apparatus and sticks.

Slide 20 (picture) abstract style of representation: style represented by top pair now appeared for the first time in Nabenchauk. Abstraction had been added to analysis. Our hypothesis was that it was participation in the money economy that caused this change to a more abstract, less specific or detailed style of representation.

Slide 21 (model) (Appended at end.)

This structural equation model confirmed the hypothesis. Again, the model also shows a pathway from the distal variable of historical period to the proximal cognitive variable of representational style. The model is based on 184 girls and boys representing a generation who were young in 1969 and 1970 and the generation of their children, who were young in 1991. Because we had both boys and girls in the data set, we made a scale of family participation in non-textile commerce. Almost all items could equally apply to boys or girls. The scale included such items as purchase of a tv, working in a local shop, and selling peaches. Historical period again refers to whether a subject was a member of the earlier generation, studied as children in 1970, or the next generation, studied as children in 1991. The latent variable of abstract representation was based on the number of medium and thick sticks used to represent stripes in the old poncho and shawl. This model shows that, from one historical period to the next, participation in nontextile commerce increased, just as textile-related commerce increased in the last model. An increase in commerce,

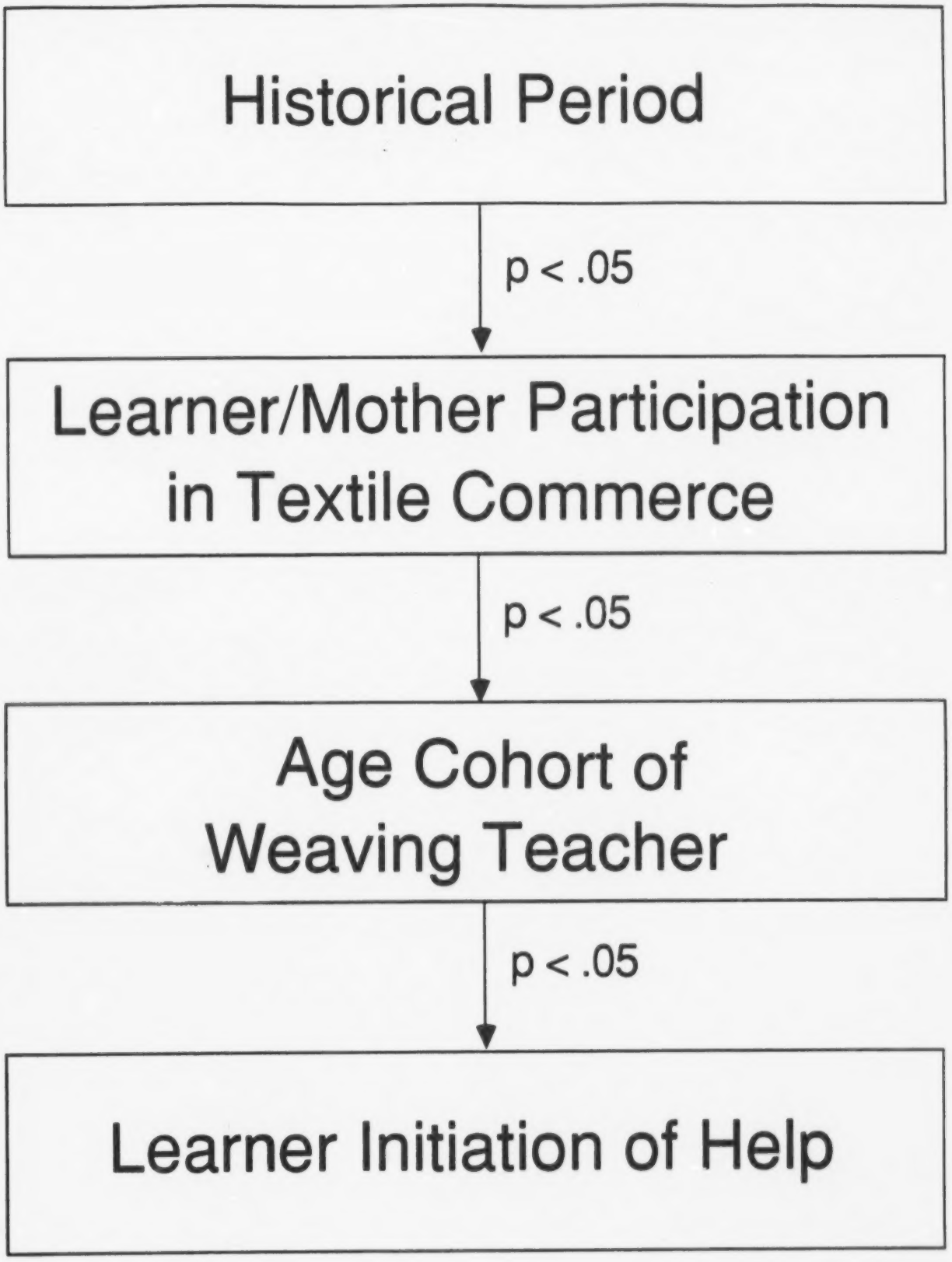
in turn, caused a shift toward a more abstract mode of representation. The fit of this model to the data is at the maximum value of 1. Each of the individual links in the model is also significant at the .05 level.

Although we tend to associate both formal schooling and maturational age with the development of abstraction, the Wald test indicated that neither of these variables contributed to mediating the historical increase in abstract visual representation.

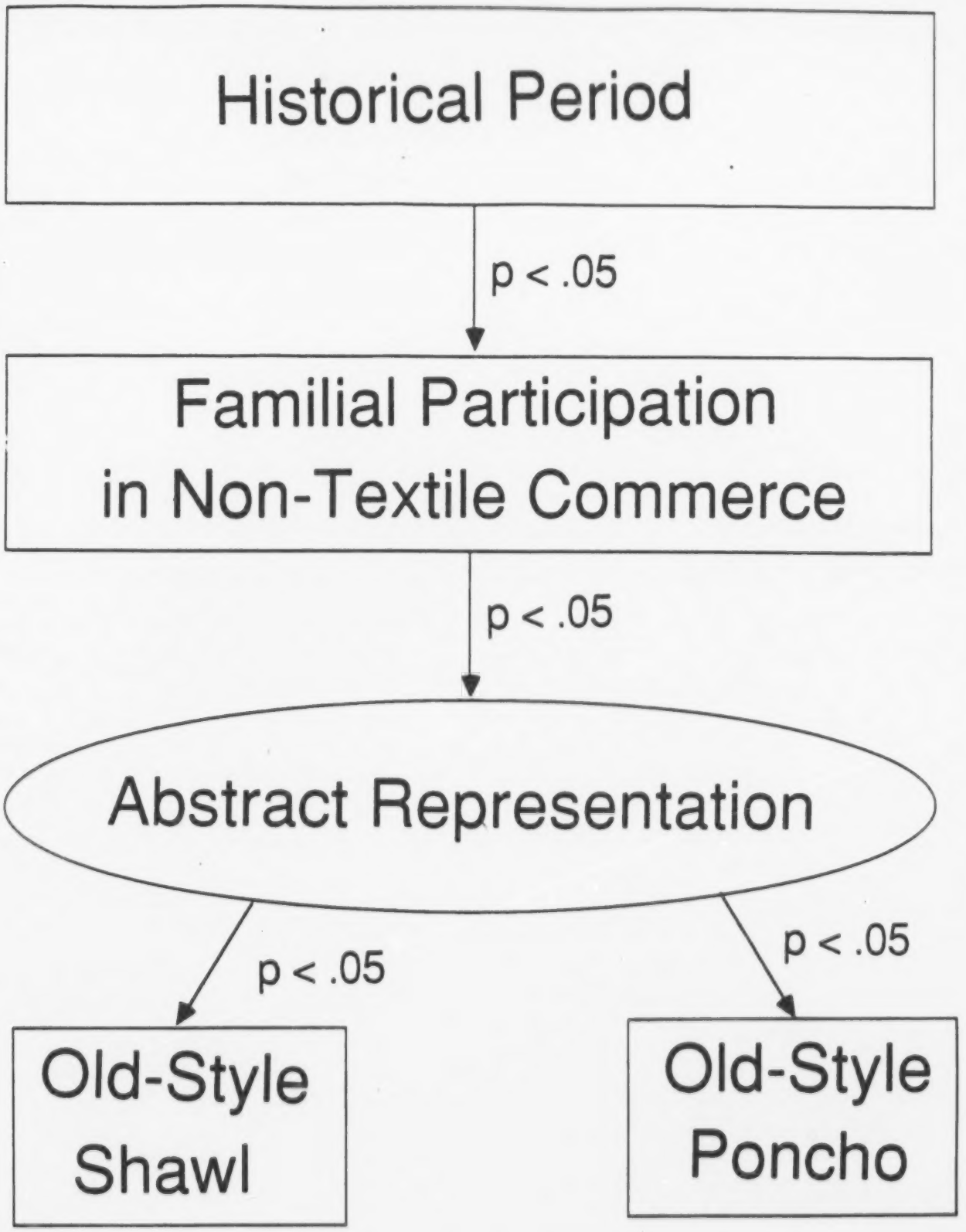
Conclusions

The direct, longitudinal study of cultural historical change has reaped rich rewards in creating theoretical and empirical links between individual processes of cultural apprenticeship and societal processes of cultural change. Our qualitative and quantitative findings point to a process of reciprocal change in which societal conditions provide an ecological push toward new modes of cultural apprenticeship, as new modes of apprenticeship create a younger generation with the skill profile appropriate to the changed societal conditions.

Our findings indicate that not only do cultures change over historical time, but the very processes of cultural learning and cultural transmission also change. More specifically, our findings indicate that processes of scaffolded guidance (the processes emphasized by Vygotsky) are highlighted when cultures are in a more stable, tradition-maintaining state. In contrast, processes of independent, trial-and-error experimentation (the processes emphasized by Piaget) are highlighted when they are in a more dynamic, innovation-oriented state. As the Zinacantecans moved from one state to the other in the space of two decades, the emphasis in their modes of cultural learning changed accordingly.



N=72 Comparative Fit Index = 1.000



N=184 Comparative Fit Index = 1.000